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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,503	09/03/2004	Ryou Obara	1823-0123PUS1	8273

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EXAMINER	
SAVAGE, JASON L	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/501,503	OBARA, RYOU	
	Examiner	Art Unit	
	Jason L. Savage	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-15* is/are pending in the application.

4a) Of the above claim(s) *14 and 15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation in claim 7 that the upper coating layer is formed on a lower coating layer which has a surface roughness as thermal spray coated and is not mechanically machined is indefinite since it is unclear whether it is the upper or lower coating layer is being defined as having the claimed surface roughness. Furthermore, the limitation 'surface roughness as thermal spray coated' is indefinite since it is unclear what this limitation entails. For purposes or Examination the claim has been treated as meaning the lower layer has a surface roughness.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori (US 4,579,712) in view of Kawagoe (US 5,875,702).

Mori teaches a graphite containing phosphor bronze coating used as a material for piston rings (col. 1, ln. 7-16). Mori further teaches that the coating may comprise Sn between 7.5-16 wt%, graphite between 1-8 wt% and phosphorous between 0.03 to 1 wt% with the balance essentially consisting of Cu (col. 2, ln. 20-39). However, Mori is silent to the coating material being applied by thermal spraying.

Kawagoe teaches a method for applying coatings to sliding components such as swash-plate type components (col. 1, ln. 7-12). Kawagoe further teaches that the coating may be a copper based bronze coating (col. 7, ln. 37-47 and col. 9, ln. 17-27). Kawagoe also teaches that the bronze coating may contain solid lubricants such as graphite (col. 10, ln. 38-44). Kawagoe teaches that flame sprayed-copper alloys were found to have improved properties over sintered alloys having the same compositions including fine structure, high hardness, the ability to adjust the structure making it possible to change the sliding properties in conformity with the usage conditions (col. 3, ln. 43-54). Kawagoe also teaches that improved seizure resistance and wear resistance are provided for a swash plate component due to using the spraying method in place of a sintered alloy (col. 3, ln. 54-57).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have followed the teachings of Kawagoe and to have modified the invention of Mori by applying the coating by a spraying technique in order to have formed a coating having fine structure, high hardness, and improved seizure resistance and wear resistance

Regarding the limitation that graphite be from 5 to 50 % in the claims, the teaching in Mori of 1-8 wt% overlaps the claimed range between 5-8 wt%.

Regarding claim 2, the coating formed by Mori as modified by Kawagoe would meet the claim limitation of being formed on a peripheral surface.

Regarding claims 4 and 5, Mori teaches that phosphorus may be included in the coating in an amount of between 0.03-1 wt% which would meet the limitation that P be containing in an amount of 1.0 % at the highest in claim 4 and that the total amount of the claimed elements is no more than 25 % in claim 5

Regarding claim 6, Mori teaches the hardness of the coating layer is 55.0 Hv (col. 6, Table I). Although the hardness would vary somewhat from that disclosed in the table due to the greater amount of graphite and forming by thermal spraying as opposed to the powder deposition process recited by Mori, it would be reasonable to expect that the hardness would be substantially less than the 300 Hv maximum claimed by Applicant.

Regarding claim 7, the references are silent to forming a coating structure having upper and lower coating layers. However, absent a teaching of the criticality of forming upper and lower layers, it would not provide a patentable distinction over the prior art. It would have been obvious to one of ordinary skill to have formed multiple layer coatings on the component of Mori as modified by Kawagoe in order to have formed a thicker coating.

Regarding claims 8 and 13, Kawagoe teaches thee coating thickness may be between 5-500 μm which overlaps the range claimed between 50-500 μm (col. 9, ln. 50-60).

Regarding claims 9 and 10, the teaching of Mori that coating may comprise Sn between 7.5-16 wt% and graphite between 1-8 wt% (col. 2, ln. 20-39) overlaps the ranges of materials claimed.

Regarding claim 11, Mori teaches that a phosphorus content which overlaps the range claimed by Applicant between .03-0.5 wt%.

Regarding claim 12, Kawagoe teaches that it is desirable to add Pb in an amount of at most 3% in the coating (col. 8, ln. 28-67). Kawagoe also teaches that the lead content is between 2-15% which overlaps the range claimed (col. 4, ln. 12-25). As such, it would have been obvious to one of ordinary skill in the art to have added Pb to the coating of Mori with amounts ranging between 2-5% in order to have provided enhanced lubricating effects to the coating.

Prior Art Made of Record but not Relied Upon

The following is a listing of prior art made of record but not relied upon in the rejections above:

Mizutani et al. (US 2002/0020286) teaches swash plate components having coatings formed thereon which improve the slidability of the component wherein the coating may be selected from a wide variety of materials including a copper based alloy which may be deposited by spraying or sintering (par[0036-0037]). Mizutani further

teaches that pistons of the swash plate component may have the same coatings to improve the sliding characteristics of the piston (par[0047]). Mizutani also teaches that the copper based alloy may be a material such as a lead bronze (par[0056]).

Sato et al. (US 2004/0091732) teaches a sliding part such as for use in swash plate components (par[0002]). Sato further teaches that the sliding part is coated with a Cu-based alloy film comprising 5-20 mass% Sn and Cu-plated lubricant powder such as graphite (par[0027-0030]). Sato does not explicitly recite the mass percent of the graphite in the coating, however it teaches that the amount of Cu-plated graphite is preferably between 1-50 parts by volume with respect to 100 parts by volume of the Cu-Sn alloy powder (par[0031]). Sato further exemplifies an embodiment wherein the Cu-plated graphite content is 7 parts by volume (col. 4, see Example 1 in table).

Response to Arguments

Applicant's arguments filed in the Amendment of 7-20-06 have been considered but are not persuasive.

Withdrawal of claims 14-15

Applicant traverses the withdrawal of claims 14-15 on the grounds that the subject matter claimed does not differ significantly from that claimed in claim 7. However, Applicant did not point out the error in the reasoning for the restriction which stated the two groups of claims are not obvious variants. As such, claims 14-15 remain withdrawn and the restriction is considered FINAL.

Rejection under 35 USC 112 (paragraph two)

Applicant has amended claim 7 in an attempt to overcome the rejection, however the amendment does not appear to clearly set forth which layer has the claimed surface roughness. It is presumed that Applicant intends for the lower coating layer to have the claimed surface roughness, however the claim could be interpreted as meaning either of the coating layers could have the claimed surface roughness. Clarification is required. Furthermore, the limitation of 'has a surface roughness as thermal spray coated' is still considered indefinite since it is unclear what this limitation entails. As was cited above, for purposes of Examination the claim has been treated as meaning the lower layer has a surface roughness, which would be an inherent property of all layers since every layer has some type of surface roughness.

Rejection of Claims 1-13 under 35 USC 103(a)

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason Savage
10-12-06

JENNIFER C. MCNEIL
SUPERVISORY PATENT EXAMINER
10/12/06